

### **REMARKS**

Claims 43-48, 51-67 and 70-88 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### **REJECTION UNDER 35 U.S.C. § 112**

Claims 43, 62 and 81 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description. This rejection is respectfully traversed.

Applicant asserts that the Examiner has misconstrued the pending claims. In particular, claim 43 recites “a digital memory arranged in parallel with the capacitor and operable to store the local weight in a digital form”. From this claim language, it is understood that the digital memory stores the local weight in a digital form, not the capacitor. This interpretation is grammatically correct and supported by the specification. Given this understanding, there is no need to amend either the claim or the specification. Nonetheless, applicant has amended claims 43, 62 and 81 to clarify this point, thereby rendering this rejection moot. In light of the specification and the previously presented claims, this amendment should have been anticipated by the Examiner and thus presents no new issues for consideration. Therefore, the Examiner is requested to enter this amendment at this time. Applicant further requests the Examiner reconsider and withdraw these rejections.

### **REJECTION UNDER 35 U.S.C. § 103**

Claims 43-48, 51-57, 59-67, 70-76 and 78-80 stand rejected under 35 U.S.C. §102(b) as being unpatentable over a dissertation by Oh entitled “Analog CMOS Implementation of Artificial Neural Networks for Temporal Signal Learning” (Oh) in view of article by Schwartz et al entitled “Analog CMOS Implementation of Artificial Neural Networks for Temporal Signal Learning” (Schwartz). This rejection is respectfully traversed.

Oh relates generally to an analog implementation of an artificial neural network. As conceded by the Examiner, Oh does not teach a learning circuit that updates a local weight and stores the local weight in a capacitor as well as in a digital memory within the cell. In particular, Oh does not teach storing weights locally in a digital memory. The Examiner relies upon Schwartz to teach this aspect of the present invention.

Schwartz discusses a programmable analog neural network chip. Schwartz teaches a network uses MOS capacitors for analog storage of weights. Contrary to the Examiner’s assertion, Schwartz does not teach or suggest storing weights locally (i.e., on chip) in a digital memory. Sections of Schwartz referenced by the Examiner (i.e., on page 314) teach capacitor leakage can be refreshed externally by conventional digital refresh circuitry. In other words, the digital memory used to refresh the analog memory is off the chip. The inventor has confirmed this understanding of the Schwartz. This design is nowadays referred to as chip-in-loop. It is appreciated by those skilled in this art that such designs are not viable because they are not integrated on-chip and introduce problems with accuracy and mismatches. Thus, Schwartz fails to remedy the deficiencies of Oh.

In contrast, applicant's pending claims recite that the learning circuit, capacitor and digital memory are all within a cell and thus reside on the chip. Since Schwartz fails to teach or suggest a learning circuit that updates a local weight and stores the local weight in a capacitor as well as in a digital memory within the cell, it is respectfully submitted that the pending claims recite patentable subject matter over this relied upon combination or references. Accordingly, Applicants respectfully request the Examiner reconsider and withdraw these rejections.

### **CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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